

H.A

Notice of Allowability	Application No.	Applicant(s)	
	10/632,598	SHEPHERD ET AL.	
	Examiner	Art Unit	
	Michael K. Luhrs	2824	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 18 February 2005.
2. ☒ The allowed claim(s) is/are 1-26.
3. ☐ The drawings filed on _____ are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date 11/18/04. *(corrections proposed 2/18/05 approved by examiner)*

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input checked="" type="checkbox"/> Other <u>updated search</u> . |



RICHARD ELMS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

DETAILED ACTION

1. This application is in condition for allowance except for the presence of claims 27-32 to device (product-by-process) (Group II) non-elected without traverse. Accordingly, claims 27-32 have been cancelled.

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

3. Cancel claims 27-32.

The application has been amended as follows:

4. Claims 27-32 have been cancelled.

Allowable Subject Matter

5. Claims 1-26 are allowed.

6. The following is an examiner's statement of reasons for allowance:

Regarding claim 1, there was no suggestion or teaching in a search of prior art *for the introduction into the spark plasma, a volatile liquid in which particles are suspended*. Pertinent art is clearly by the applicant[s] himself, see R-1 reference, on applicant's IDS dated 23 February 2004, namely, Shepard et. al. "Improved electroluminescence of spark-processed silicon by an aerosol-assisted technique" that was published in May of 2003, that indicates on p. 223, the novel aspect of the introduction of the volatile liquid having particles suspended, [directly] into the spark plasma.

Regarding claim 20, there was no suggestion or teaching in a search of prior art *for the introduction into the spark plasma, a volatile liquid in which a salt of a heavy ion is dissolved.*

Again the closest art is by the applicant[s], see above for claim 1.

7. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Amendment

8. St. John et. al. use a syringe to apply a liquid solution right onto the semiconductor surface (line 8, "Abstract"), and see that St. John's liquid is permitted to evaporate at room temperature (see line 3, in the "Results and Discussion" section, p. 425, in St. John, et. al.) thus, apparently the solution is already sitting there, permitted to evaporate, prior to ever having the spark. This is different from present invention of introducing the volatile liquid into the spark plasma.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. R.E. Hummel and S.-S. Chang (1992) Appl. Phys. Lett. 61:1965-7, teach the method of spark-processing silicon. In USPN 5,733,662, Bogachek teaches an plasma coating process. See the spark-processing silicon apparatus by Spence, USPN 6,083,555. Serole USPN 5,723,027 and Upadhyia et. al. USPN 5,468,357 and Hack et. al. USPN 6,113,746 (re: Hack et. al. is on applicant's I.D.S.) teach a coating process, powder reaction, porous article densification and altering magnetic properties, respectively.

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10. The complete description of spark-processing is found in Chapter 6 of Silicon Based Materials and Devices, edited by Nalwa, Hari Singh, Academic Press, volume 1, pp. 238-266, wherein St. John is cited on p. 258, and [volatile] alcohols are used on p. 251; this chapter is by the present inventor R.E. Hummel.

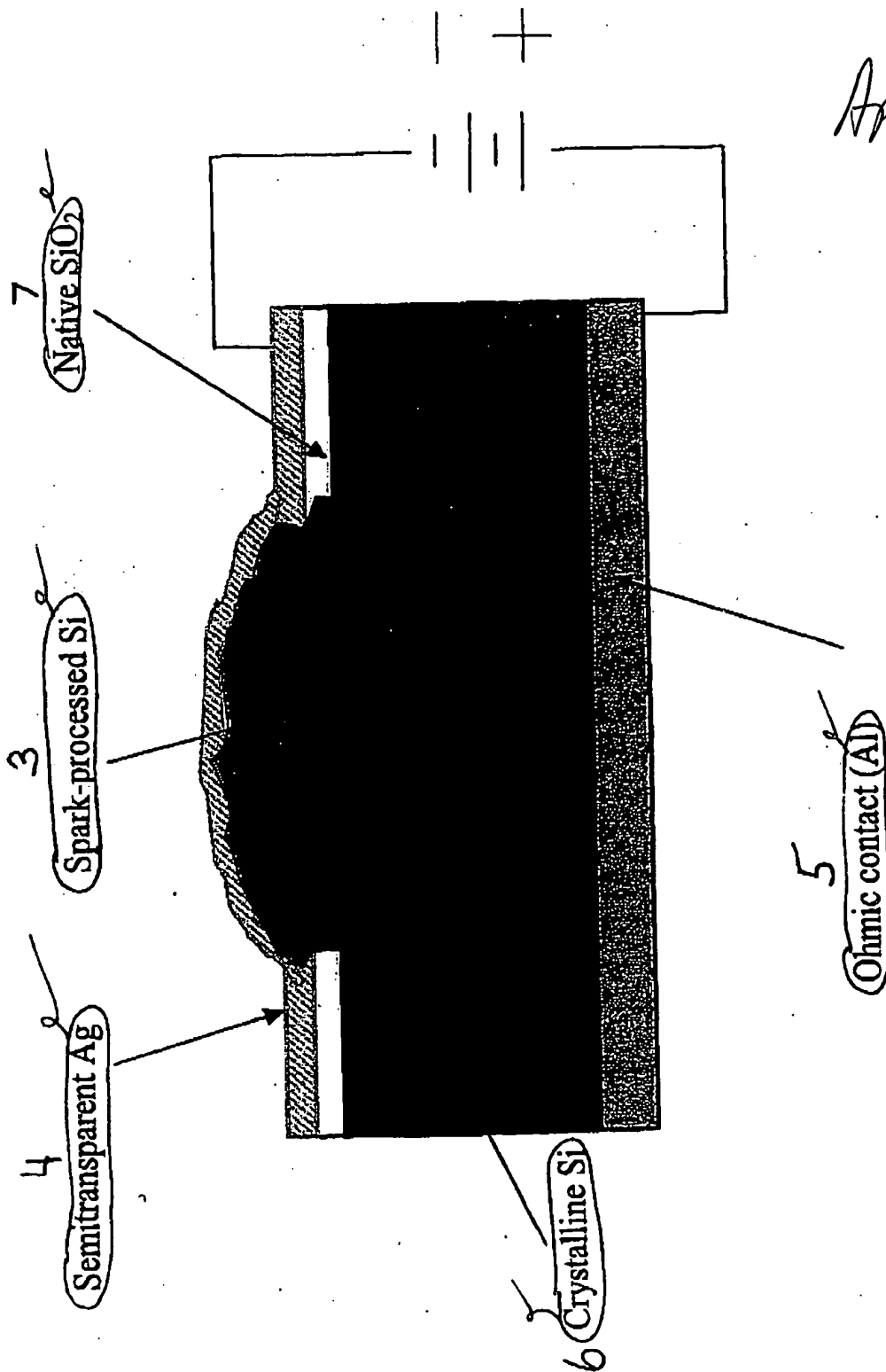
11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael K. Luhrs whose telephone number is 571-272-1874.

The examiner can normally be reached on M-F, 8-5.

12. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard T. Elms can be reached on 571-272-1869. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

13. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

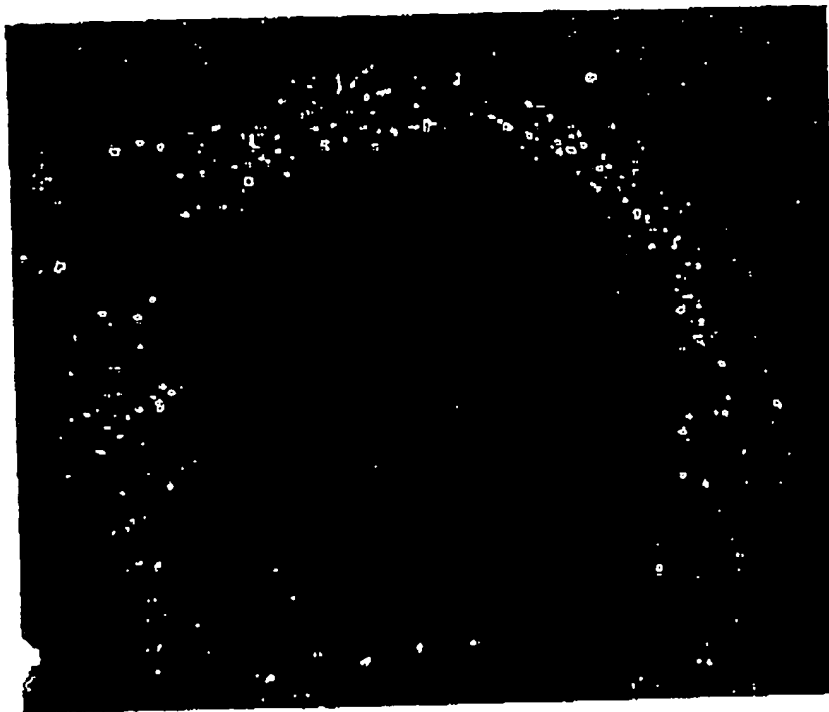

Michael K. Luhrs
6/13/05



*Approved
MKR
5/3/05*

FIG. 1
(Prior Art)

Approved
MKT
5/3/05



← 3 mm →

FIG. 2
(Prior Art)

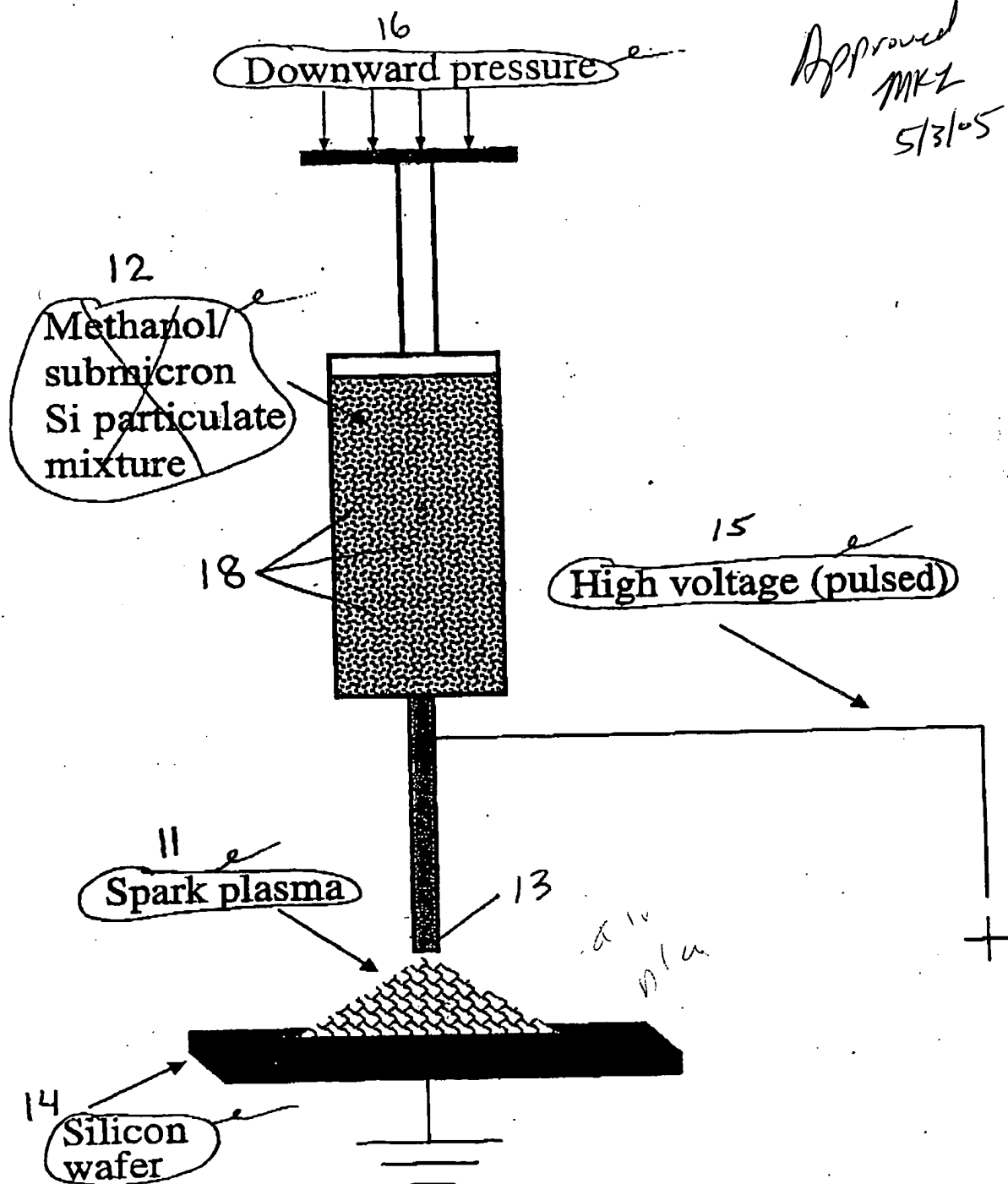
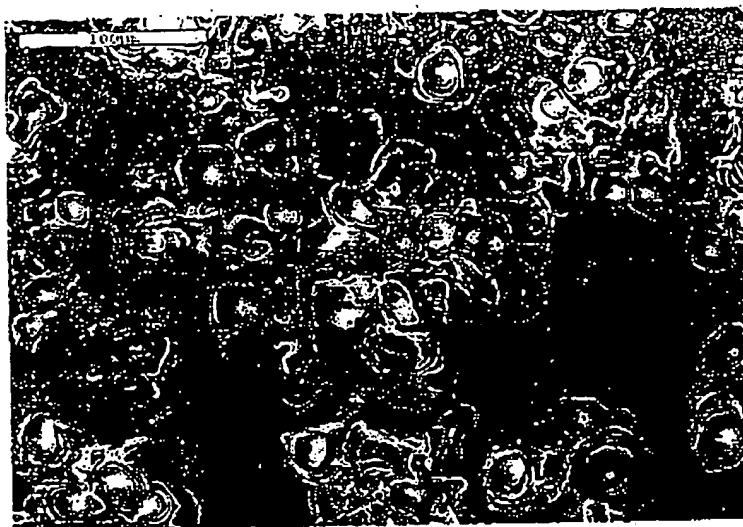


FIG. 3



Approved
MPL
5/3/05

FIG. 7C

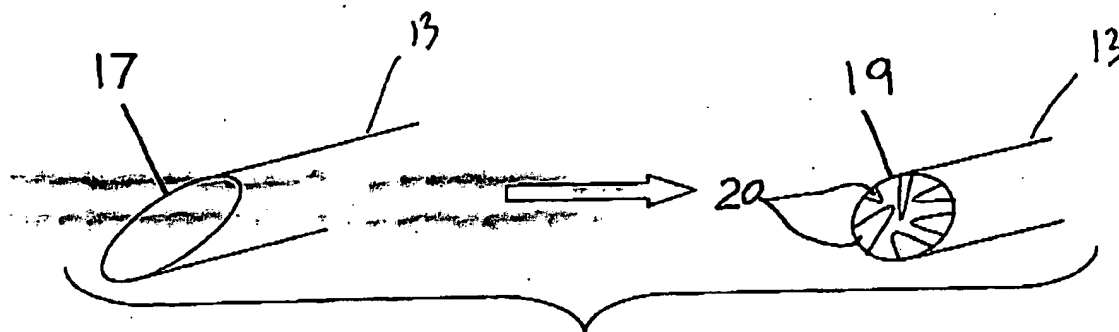


FIG. 8